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# Collective Predicates, Aktionsarten and All

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## I. Issues

The following pair of sentences is introduced in Link(83):

1a. The children built the raft.
b. All the children built the raft.

Sentences 1a and b differ in meaning. One objective of an analysis of the semantics of all is therefore to describe this difference. The second objective is to explain the difference via the formalization of the semantics of all.

Link's impressionistic description of the semantic shift caused by the addition of the determiner all raises most of the essential points that will be discussed in this paper:

> "It seems to me that in all the children built the raft it is claimed that every child took part in the action whereas in the children built the raft it is only said that the children somehow managed to build the raft collectively without presupposing an active role in the action for every single child."

Link's use of every or every single is particularly noticeable. It suggests that the addition of all results in something being predicated of every individual in the plural subject, rather than of the plural subject itself, as an entity. (This doesn't rule out the latter, in addition to the former.)

Link also makes an important distinction between taking part in the action and managing to achieve the result. This distinction seems to be somewhat unconscious on his part, but I will show that it turns out to be central to the analysis of the behavior of all.

Finally, Link's description focuses on the notion of 'taking part in Pred' as some how distinct from 'doing Pred' or 'Pred-ing'. He primarily addresses this latter point. The main problem is the invalidity of the equivalence of <All the Xs P> and <Vx, x ∈ X,P(x)>.

The following sentences illustrate the lack of equivalence which arises for some predicates :

2 a. All the puppies are sleeping -->
Every puppy is sleeping
b. All the children were building the raft -->
Every child was building the raft.
c. All the children built a raft *--->
Every child built a raft
d. All the children built the raft -->
#Every child built the raft[1]

The all versions of sentences (2a) and (2b) seem to be equivalent to the every version of the same sentence. However, the all version of sentence (2c) is ambiguous. There is a group reading in which the children together build one raft. There is also a reading in which each child built their own raft. The version of the sentence with every is grammatical but excludes the first reading. Therefore the sentences are not truth-conditionally equivalent. Finally, for (2d) the multiple-raft reading is infelicitious because the direct object is definite (the raft). Moreover, the group reading not available for every, so the only possible interpretation involves a raft which can be built and rebuilt many times, which is pragmatically unusual.

The predicates for which the all and every sentences are logically equivalent, are sleeping and were building the raft, are distributed predicates. The problem of non-equivalence occurs with collective predicates such as built the raft in (2c) or (2d). In (2d), although the group the children built the raft, we do not feel that the predicate built the raft holds of the individual members of the subject group. Yet, we do feel that the all version of (2c) or (2d) predicates something of each individual. What is it, then, that does hold of every individual member? This is the question which Link tries to answer with the 'takes part in' description.

First, a few tentative definitions:

distributive predicates are true of a plural subject only if they are true of each individual in the group. Probably they should also be able to be predicated of a singular subject.

eg. be asleep, run a mile, scream

collective predicates are normally true of a group and not of the individual members of the group.

eg. gather, disperse, elect

ambiguous predicates are ambiguous. They seem to be able to be interpreted as distributed actions or collective actions. Hence, they can occur with either singular or plural subjects. Also called 'group endeavors' or 'collective accomplishments'.

eg. build the house, carry the piano upstairs

Before reviewing the details of Link's proposal for the treatment of all with collective predicates, it is necessary to consider the effect of all with distributive predicates.

A distributive predicate can be true of an individual:

The puppy barked.

When the subject is plural, the distributive predicate seems to also become plural. That is, there seems to be (at least) one whole occurrence of the predicate for each member of the subject. Informally, in sentence (3a) below there is a 'barking' for each puppy, not just one 'barking', although this does not rule out the simultaneous occurrence of many of these individual 'barkings'.

3 a. The puppies barked.
b. All the puppies barked.

The addition of all in (3b) has an effect which has been termed the Maximizing Effect. (3b) seems more stringent than (3a) in its requirement that every member of the group the puppies did indeed bark.

Dowty(86) provides the following example of the same semantic shift:

4a At the end of the press conference, the reporters asked the president questions.
b At the end of the press conference, all the reporters asked the president questions.

The (a) version does not require that all the reporters asked questions. In fact, it does not even require that a majority of the reporters personally asked a question. It might have been that only a few of the assembled group of reporters actually asked a question.

The addition of all also has the Maximizing Effect on collective or ambiguous predicates, as the original pair of sentences with the predicate built the raft demonstrate. Therefore an analysis of the effect of all must include two things - an account of the maximal distribution of predication over the individuals in a plural subject and the specification

of exactly what predicate is distributed in the case of collective predicates.

## II. Link's proposal

Link(83) proposes a theory of plurals which sets up a relationship between a plural entity like the children and its 'atomic' subparts, which in this case would be each child. Predicates are also marked with respect to their compatibilility to atomic, plural or mass subjects. A plural predicate is inherently incompatible with a singular atom such as child. Therefore, any process which simply distributed the given plural predicate over the atomic subparts of the subject would lead to ungrammatical results. In fact, distribution of collective predicates with every or each seems to behave in just this way - the original predicate is distributed, which usually results in ungrammaticality.

But collective predicates like built the house can combine with all. Therefore, Link proposes a translation of all which introduces a distributed predicate related to the original collective predicate and intended to have the approximate meaning 'takes part in'.

The primative operator $^{T}$ applies to a predicate P yielding $^{T}P$, which is read 'partakes in P'. For example, if P = built the raft, a predicate than can apply to a nonatomic individual (a group), then $^{T}P$ is the atomic predicate 'took part in building the raft. The sentence All the children built the raft translates as approximately the following:

> The children built the raft and every child took part in building the raft.

The actual nature of the relationship between the group predicate and the partakes-in predicate is left completely undefined except for the following: each member of the group had to have done something, represented by $^{T}P$. Link feels that this must be left vague, since it is determined by extra-linguistic properties of the world. That is, our world knowledge defines what we feel to be an actual contribution to building the raft. The fine distinctions of whether the children who just stood around and watched, or the children who brought lemonade or the children who paid money to have a contractor do their part of the building actually qualified as having $^{T}P$'ed in some particular case are left as beyond the scope of the semantics.

In summary, Link observes that the addition of all to a sentence causes a stringently maximal interpretation of the subject, called by Dowty the Maximizing Effect. Link proposes

to formalize this as universal quantification over the atomic elements in the plural subject. But distributivity over atoms is inappropriate with collective group predicates, which leads to the proposal of a primitive, undefined 'take part in' operator which derives an atomic predicate from each collective predicate and is part of the translation of all.

This is not entirely satisfyling because it is more a formal statement of the problem than an explanation. The data leads to the observation that to formalize the effect of the addition of all to a subject NP, we want to add distribution of the predicate over the individual members of the plural subject. However, with collective predicates, unlike simple distributives such as sleep or bark, it is not appropriate to predicate the verb phrase, as is, of each individual in the subject. Therefore, something else must be predicated of these individuals and it must be somehow related to the original predicate, P. $^{\uparrow}P$ is a label for this other predicate. The nature of the function $^{\uparrow}$ is not known, but it represents the kind of thing that will be true of individuals in the plural subject of a collective predicate when the predicate P is true of the group.

III. Dowty's analysis

Dowty(86) takes up the notion of a 'partakes in' predicate related to a collective predicate and attempts to refine Links proposal in a more explanatory way. First, he proposes that all is a universal, distributive quantifier. For collective group predicates like build the raft in the above sentences, the issue then is what is distributed. Dowty replaces Link's 'partakes in ' operator, which is introduced into a sentence by all, with the notion of distributive subentailments, parts of the lexical meaning of a collective predicate which are, nonetheless, distributive.

Dowty's analysis has two parts. First he notes, in agreement with Link, that the addition of all adds the force of universal quantification, where without the all, something less than universal quantification was present. Dowty attributes the observed absence of universal force to the specific lexical content of predicates. For example, each of the following predicates seems to have to hold of a different portion of the individuals in the subject.:

5 a. The students voted for the proposal
  b. a majority of the students...

6 a. The students left the classroom
  b. all?

7 a. After the talk, the students asked the speaker questions
b. As few as one or two, out of a larger group of assembled students

8 a. During the job talk process, the students ate lunch with the candidates in the ballroom.
b. Some...

Dowty notes that the above pattern seems to be related to the behavior of predicates in generic sentences, as discussed in Carlson(77):

9a Dogs are mammals
b Dogs bark
c Dogs bear live young
d Dogs are common

The first sentence is a generic which is true of all dogs. The second is perhaps true of most dogs, or a majority of dogs, although in fact is false of entire breeds of dog (eg. the Basenji, or Barkless dog). The third sentence is only possibly true of female dogs, so perhaps it could be said that it is true of half of all dogs. The fourth is not true of any individual dog, but only of dogs collectively. Carlson concludes that the predicate of each sentence, rather than a generic quantifier with a specific meaning approximated by one of every, most, usually or even generically determines the quantification over the subject. Dowty suggests that the same situation exists for predicates with non-generic subjects without all as the subject determiner. Likewise, the addition of all to the above generic sentences results in the Maximizing Effect, requiring the predicate to be true of every individual dog:

10 a All dogs are mammals
b All dogs bark
c All dogs bear live young
d *All dogs are common

In this case, (10a) remains true. (10b) is false. (10c) ought to be false, but I'm not sure about my judgement. (10d) is ungrammatical because 'be common' is a collective (kind-level in Carlson's terminology) predicate which is not applicable to the individuals in the subject.

The similarity of the data from Carlson and the data considered in Dowty shows that maximizing and distributing a predicate over individual members of a group are consistent parts of the semantic contribution of all.

To understand Dowty's proposal, it is necessary to consider as

wide an array of data as possible. Dowty adds several distinct cases to the data provided by Link. These are the sentences in C and E below. In addition, I have added some cases of collective predicates of a type which Dowty did not consider, but which will be central to my critique of Dowty and to my own proposal. These are represented by the sentences in D:

A. Distributive Predicates : all has Maximizing Effect, only

a. The children ate lunch
a' All the children ate lunch

B. Collective Predicates: all has Maximizing Effect and Partakes in

a. The children built the raft
a' All the children built the raft
b. The students gathered in the hallway
b' All the students gathered in the hallway

C. "Pure Cardinality Predicates" : all is ungrammatical

a. The students are a big group
a' *All the students are a big group
b. The koalas in Australia are numerous
b' *All the koalas in Australia are numerous
---
c The trees are denser in the middle of the forest
c' *All the trees are denser in the middle of the forest
(these examples are due to B. Partee)

D. Additional collective predicates: all is ungrammatical

a. The senators passed the pay raise.
a' *All the senators passed the pay raise.

b. The voters elected Bush
b' *All the voters elected Bush

c. The jurors returned a verdict of 'not guilty'
c' *All the jurors returned a verdict of 'not guilty'

d. The students decided unanimously to skip class
d' *All the students decided unanimously to skip class

E. Truth conditional shift

a. The students voted for the proposal
a' All the students voted for the proposal

The main observation which emerges from consideration of this

broader range of data is that there are many cases in which addition of the determiner all to a collective predicate results in ungrammaticality. This is illustrated by the classes in C and D. However, the acceptability of the collectives with all in B argues against any claim that all is only compatible with distributive predicates, as did Link's observations in the previous section.

Taking into account all but the type of data in D, Dowty proposed that some collective predicates have entailments that apply to individuals even though their primary entailment is collective. He calls these the distributive subentailments of a predicate. True distributive predicates are predicates which have "only" distributive subentailments. For Dowty distributive subentailments take the place of Link's 'partakes in' operator.

As a specific example, Dowty discusses the predicate gather which is a collective predicate but can occur with all, as demonstrated above in (B (b)). The predicate is not grammatical with a singular subject but its meaning seems to contain some elements that must be true of individuals, rather than of a group. He describes the distributive portion of its meaning as follows:

"Consider what is required for The students gathered in the hall to be true. Clearly, every student in the group referred to by the students (or 'most every student') must come into the hall and remain long enough that they are all there at a common time."

The sub-entailments proposal also provides Dowty with the means to characterize the maximizing effect. Normally, as both Dowty and Carlson's data argued, a predicate carries its own requirements for distribution. Thus, different quantifiers seemed to be present with the same subject, depending on the choice of predicate. In Dowty's terms, the required distribution of a predicate's subentailments is normally non-maximal. It is specified by a combination of lexical and contextual factors. However, all introduces a universal quantifier which distributes the subentailments to every individual in a plural subject. This is stated in Dowty's hypothesis (19):

(19) Hypothesis: the effect of all on a collective predicate is to fully distribute the predicates sub-entailments to every member of the group argument: Instead of merely holding of some (proper) subset of these members, as required by the predicate by itself, all requires that these sub-entailments hold of every member of the group.

In effect, all is seen as overriding a predicate's original requirement that its entailments apply to 'most' or 'a majority' or 'a few' of the individuals in the subject, and enforcing its own requirement that the entailments apply to every individual.

Dowty's proposal has a major advantage over the $^{T}$ 'partakes in' operator of Link(). Since for Link the distributable 'partakes in' factor is part of the translation of all, his system seems to predict that all will be able to distribute any collective predicate. The data shows that this is incorrect. Dowty, in placing the means of distributivity, the sub-entailments, on the predicates rather than on all, at least allows for the possibility that the combination of all and some predicates will be ungrammatical.

Predicates like those in (C(a) & (b)) above do not permit all in the subject. These, Dowty suggests, are collective predicates which have no distributive subentailments. Dowty terms these predicates the 'pure cardinality' predicates, which is an intuitive response to the fact that many of them seem to have something to do with number : be a large group, be numerous, be common, be rare, be a happy couple, be a foursome etc. Since all operates on the distributive sub-entailments of a predicate, it is not compatible with any predicate that lacks sub-entailments. Thus, Dowty's explanation for the ungrammaticality which results from the addition of all to a sentence with a collective predicate is that the predicate lacks sub-entailments.

This brings up the major criticism against Dowty's proposal. His only explanation for the ungrammaticality which results with some collective predicates and all is that these predicates do not have sub-entailments for all to operate on. Moreover, there is no principled way given to determine whether a predicate has sub-entailments, except by observing whether it is grammatical with all.

Dowty shows that it is not difficult to come up with an approximate description of the elements of the predicate that would pertain to the individuals in the group subject rather than the subject itself (the subentailments). But this is only true once we know that we want a collective predicate, such as gather, to have distributive subentailments. However, if we wanted 'be a large group' to have a distributive subentailment, we could say that it was that each individual had to 'be a small percentage of the total group', for example.[2] Again, if 'be a winning team' were compatible with all (*all the Dodgers are a winning team) then we would easily come up with distributed properties (eg. 'be a player on the team') for all to operate on. But we don't want these cases to have

subentailments because of their incompatibility with all, yet we have no particular way to rule out these proposed subentailments.

In calling the class of predicates without sub-entailments the 'pure cardinality' predicates, Dowty seems to have felt that there was a link between the group-size orientation of the predicates and their lack of sub-entailments. Dowty did not consider the predicates in (D), which do not seem to form a natural class with the ungrammatical collectives in (C). However he was not even comfortable classifying a case like be denser in the middle of the forest as part of his 'pure cardinality predicate' class, even though it seems to behave just like 'be numerous'. Certainly, be dense might have sub-entailments not unlike those of gather (eg. be in a location close to the other members of the group) and likewise be a happy couple could have some sub-entailment about being happy, and be a successful partnership could have some entailment about individual success.

The existence of predicates that are incompatible with all in the same way as be numerous or be a large group but have more semantic content shows that 'pure cardinality' is not the relevant distinction determining whether a predicate has sub-entailments. Moreover, the inability to provide any other means of predicting which collective predicates will not have sub-entailments, and hence will not combine with all, is a failing of the sub-entailment proposal.

IV. The vote-for ambiguity and the result/action distinction

There is one final case to consider in light of the sub-entailments analysis. The pair of sentences with the predicate vote for, in (E) above, exhibit a considerable shift in truth conditions depending on whether all is present or absent. Without all only a majority of students need to have cast a vote in favor of 'the proposal', but with all added to the sentence, every student must have cast a favorable vote. Dowty uses his proposed system to analyze this as follows:

The predicate vote for is a collective predicate with a distributed sub-entailment roughly equivalent to "cast an individual vote for" which applies to individual members of a group. But, the collective predicate itself refers to the outcome of the vote and only requires that a majority of the members of the collective subject actually fulfill this subentailment. The function of all is to override the predicate specific majority-only requirement on the ' cast a vote for' sub-entailment and to force it to be maximally distributed over 'the students.'

However, vote for differs from a collective like gather in that its supposed sub-entailment can occur independently as the only entailment of the predicate. That is, vote for is a distributed predicate:

11a. I voted for Dukakis
b. The voters in my family voted for Dukakis
c. All the students voted for Dukakis

In the above uses, vote for means the individual action of casting a vote in favor of. It has no necessary implications about the outcome of the vote. Even with the voters in my family, a plural subject without all to override lexical specifications, the most natural reading is to assume that each voter in my family cast a vote 'for Dukakis'.

However, vote for can also refer to the outcome of a vote. In this case it is a resultative predicate and it is collective. A number of the individual actions may have been 'against', but the outcome, according to some specific method of tallying votes, came out 'for'. Dowty is, I think, saying that this latter sense is the 'main meaning' of the predicate, and that the first sense is a subentailment of this main entailment. However, this is not the only possible explanation of the existence of two different senses. The other explanation is that the predicate is ambiguous. The fact that the distributed sense can occur on its own supports this view.

The 'outcome' or 'result' sense of vote for should also be able to occur on its own. I think that it can, but since it is ambiguous, it is hard to demonstrate the desired reading. Two predicates related to the resultative sense of vote for are pass and elect. As shown by the sentences above in (D), neither predicate yields grammatical sentences when all is added to the plural subject. Here again, the sub-entailments approach is lacking. We must say that the predicates 'vote for' or 'choose' have distributive sub-entailments, while predicates like 'elect' or 'pass' simply don't. Moreover, the fact that 'elect' and 'pass', as well as the sense of 'vote for' that disappears when all is added, are result-oriented predicates is a generalization that goes unaccounted for.

The behavior of these predicates indicates that the action/resultative predicate distinction is indeed relevant to the observed distribution of all. Predicates which are purely resultative are not compatible with all. Predicates with action readings, such as vote for or gather are compatible with all, even though they are interpretable as collective predicates with plural group subjects. In the next section I will show that the intuitive action/result distinction discussed here is actually part of the well-studied

Aktionsarten distinction and that systematic attention to that distinction will allow us to characterize the collective predicates which do not allow all (those which for Dowty lack sub-entailments) in terms of independently motivated predicate categories.

## V. The classification of predicates into Aktionsarten

The tradition of grouping predicates into classes based on their aspectual properties is generally traced at least back to Aristotle, and is well represented in recent theoretical semantics. Predicates are divided on the basis of a combination of semantic properties and distribution in particular syntactic contexts. These classes have been termed aktionsarten to distinguish the classes from other issues relating to the morphological marking of aspect and I will use this term in my discussion.

The particular classifications and the intuitive divisions behind them differ somewhat in the work of various authors. The literature on Aktionsarten includes Vendler(67), Dowty(79), Parsons(85ab,88), Bach(86), Hinrichs(85), Mourelatos(81) and Verkuyl(87). I will phrase my discussion in Vendlers terminology, and I believe the discussion will support his classificatory divisions over other proposals.

Vender(67) proposes four predicate categories: states, activities accomplishments and achievements.[3] The intuition behind the classifications is that some predicates denote constant states which hold of the subject unchangingly over time, others denote processes or activities which the subject performs uniformly over time, other predicates denote activities which are not uniform over time, specifically they lead to a culminating point, and finally, there are predicates which denote the culmination or resultant state without any action leading up to that result. There are a number of tests distinguishing these classes, but before presenting them I will give some examples of each class and attempt an informal description of the distinctive properties of the class.

State predicates hold of the subject, but there is no sense of process or activity associated with them. Typical examples are know, believe, have, desire, love as well as all the be X predicates, such as be sick, be beautiful, be green, be old. The predicate indicates that the state holds, but says nothing about the start or end of the time in which it holds. The most characteristic feature of this class is its failure to occur with a progressive tense, as will be demonstrated below.

Activity predicates are, in the words of Vendler, "processes going on in time." Examples are walk, push a cart, study linguistics, sleep, bark. The activity is treated linguistically as homogeneous and constant - the same at the inception of the process as it is at the conclusion (though of course they are not completely homogeneous). If someone is 'walking' then the person is walking equally at the beginning of the time period during which the predicate 'walking' is true and at the end. This class occurs with the progressive tense, which in fact is the preferred way to indicate present tense. When the simple present is used, the interpretation becomes habitual or generic as in "I walk."

The third group is the accomplishment predicates. These are processes which are not constant. The activity inherent in their meaning leads to an endpoint in which the activity ends and some specific culmination or result is accomplished. Some examples are read a book, build a house, draw a circle, walk a mile. The essential property of these verbs is that they have two parts. One is the action or task, the walking, reading, building, or drawing. The other is the outcome of the action: a house, or a circle for the verbs of creation, and the completion of a book, or the travelling of a mile, for the others. The performance of the action is similar to the simply activity predicates above but has the added requirement that the action culminate in some result.

Achievement predicates form the final group. These predicates have the final resultant state that accomplishement predicates have, but they lack the associated activity. Ryle called these 'pure lucky achievements' in contrast to plain achievements (his term for Vendlers accomplishements) to indicate that the culmination or result came without the performance of a task by the subject. Typically, these predicates are felt to occur instantaneously, in contrast to the accomplishments which happen over time. Examples include win the race, spot the plane, notice the painting, find the book, reach the summit.

A mixed array of tests have been used to distinguish states, activities, accomplishments and achievements. Many of these are clearly described and evaluated in Dowty(79). Some of the traditional tests have been criticized elsewhere, where it has been suggested that they do not distinguish the properties they are claimed to distinguish (see for example Verkuyl(87)). In the following discussion, I will describe only the tests which I believe actually do distinguish these four classes, and do not relate to other incidental properties such as agentivity of the subject. For each test, I will demonstrate how it distinguishes the classes using distributive predicates which are accepted as belonging to the relevant classes. I will then subject the collective predicates discussed above to the tests

for aktionsarten membership. It will be clear from these tests that the collective predicates which fail to allow all are in fact members of the achievement class of predicates, which is the class of predicates denoting pure culmination or result without an associated activity component. In contrast, the collectives which are compatible with all will be seen to be activities or accomplishements.

VI. Tests for predicate classification

1. The Progressive

The primary test separating the statives from the non-stative predicates is the incompatibility of the progressive tense with state predicates. Since some of the other tests do not apply to states in a straight forward way, I will discuss then here and then skip over them for the remaining tests.

states

12 a. *I am knowing the answer
b. *I am having a dog
c. *The apple is being green

activities

13 a. She is walking
b. She is sleeping
c. Ted is pushing the cart

accomplishments

14 a. She is walking a mile
b. She is painting a picture
c. She is reading the book

achievements

15 a. *John is noticing the picture
b. *The puppy is recognizing its mother
c. *The guard is spotting a plane

d. The hiker is reaching the summit
e. Genuine Risk is winning the race
f. John is dying.

As is evident from the last set of sentences, the progressive does not behave uniformly for all the achievement predicates. There is considerable discussion in the literature about how this variation is to be explained. One proposal (see Dowty(79) for example) is that achievements are not compatible with the

progressive except in certain 'extended uses' of the predicates in question.

The progressive tense is often also used to indicate future action. The 'extended use' seems to also be a future tense, or a prediction about the course of action. For example, the predicate 'is winning' means essentially the same as the predicate 'is leading'. It does not mean that the subject is in the act of winning, unlike the predicate 'is walking' which can mean the subject is currently walking. Is winning is future in the same way that 'am walking' in an utterance like "I am walking to school tomorrow" is future. I think that this extended sense can be tested for by comparing the equivalence of the progressive "Q-ing" to the predicate "is going to X":

activity: John is walking =//=> John is going to walk

accomplishment: John is painting a picture =//=> John is going to paint a picture

achievement: Genuine Risk is winning the race ==> Genuine Risk is going to win the race

John is dying ==> John is going to die.

Note that this test is intended to be a one-way implication. Certainly the truth of the utterance 'We are going to die' does not make it the case that the utterance 'We are dying' is acceptable, but I think that the implication in the other direction is valid. Moreover, this is in marked contrast to the behavior of activity and accomplishment predicates, where 'is walking' and 'is building a house' certainly do not make 'is going to walk' or 'is going to build a house' appropriate paraphrases.[4]

I do not know why this extended sense is only available for some of the achievement predicates. Predicates like notice or recognize do not allow the progressive even in the sense of a future tense, although they are fine with 'going':

John is going to notice the painting (any minute now...)

The puppy is going to recognize his owner

Verkuyl(87) suggests that the agentivity distinction really separates the achievements which can and cannot occur with the progressive. That is, agentive achievements like die or win behave like accomplishments and activities in his view. I think that they are not the same, as demonstrated by the above test. However, the agentivity distinction may be relevant to

the possibility of an 'extended sense' for these predicates.

To sum up, states are incompatible with the progressive tense. Activity and accomplishemnt predicates allow the progressive tense. Achievements are either incompatible with the progressive, or are only compatible if the progressive 'is Q-ing' is paraphrasable by the future progessive form 'is going to Q'.

The application of this test to the collective predicates under consideration allows us to distinguish them by class:

The collective states are completely bad with the progressive:

*The players are being a winning team
*The koalas in Australia are being numerous
*The trees are being denser in the middle of the forest

Activity and accomplishment collectives (as yet indistinguishable) are fine with the progressive:

The students are gathering in the hallways
The children are walking single file
The children are building the raft/a raft
The movers are carrying the piano

The collective predicates which were incompatible with all are also not compatible with the progessive, except in the 'going to Q' sense. This identifies them as achievement predicates:

The senators are passing the amendment
(== going to pass)

The voters are electing a president
(== going to elect)

2. In/For adverbials and Take/Spend Phrases

Another test separating predicates into aktionsarten is the compatibility of the predicate with either 'for an hour' or 'in an hour' type adverbial phrases. The same distinction is illustrated by compatibility of a predicate 'Q' with either the phrase 'They spent an hour Q-ing' or 'It took an hour to Q'. 'For' and 'Spend' focus on the duration of an activity and are compatible with predicates that occur over time while 'In' and 'Take' focus on the completion of a task and are therefore compatible with the result-oriented predicates.

In the examples below, I use # to indicate that the sentence is grammatical, but only with a clearly different interpretation

from the one under consideration.

Activities, which are homogeneous over their period of occurrence, take 'for an hour' as an adverbial, and are strange with 'in an hour'. They are compatible with 'spent' but not with 'took' :

16a. They walked for an hour.
They spent an hour walking

b. #They walked in an hour.
#It took an hour for them to walk

c. John slept for 8 hours.
John spent 8 hours sleeping

d. #John slept in 8 hours.
#It took 8 hours for John to sleep

Notice the sort of meaning shift that the sentences marked with # undergo.

Sentence (16d), for example, no longer refers to the activity 'sleep'. It now has the sense of 'fall asleep', an accomplishment predicate.

Accomplishments, which consist of an activity plus a culmination are better with 'in an hour' or with 'took' phrases:

17 a. John painted the picture in an hour
a' It took John an hour to paint the picture

b.?#John painted the picture for an hour
b' #John spent an hour painting the picture

c. John read the book in an hour
c' It took John an hour to read the book

d. #John read the book for an hour
d' #John spent an hour reading the book

Achievement predicates are only good with 'in an hour' or 'took' phrases:

18a. We reached the city in an hour.
a' It took an hour to reach the city
b. *We reached the city for an hour.
b' *We spent an hour reaching the city.

c. John noticed the painting in a few minutes

c' It took John a few minutes to notice the painting
d. *John noticed the painting for a few minutes
d' *John spent a few minutes noticing the paintings.

When we examine the behavior of the collective predicates in these contexts, they each pattern with their proposed class:

19. The children walked single file for an hour
The children spent an hour walking single file
#The children walked single file in an hour
#It took the children an hour to walk single file

Walk single file thus patterns with the activity predicates.

20. The children built the raft in an hour
It took the children an hour to build the raft
#The children built the raft for an hour
#The children spent an hour building the raft

This identifies build the raft as an accomplishment predicate.

21. The senators passed the proposal in an hour.
It took the senators an hour to pass the proposal.
*The senators passed the proposal for an hour
*The senators spent an hour passing the proposal.

The predicate pass the proposal is identified as an achievement predicate.

Both accomplishments and achievements occur with 'in an hour' type adverbials, but they can be distinguished in two ways. First, accomplishments do not culminate until the end of a specified period, but their activity portion is ongoing during that time:

John painting the picture in 2 hours -->
John was painting the picture for two hours.

Compare the achievement :

John noticed the painting in 5 minutes --//-->
*John was noticing the painting for five minutes.

The senators passed the amendment in an hour --//-->
*The senators were passing the amendment for an hour.

Secondly, the accomplishment predicates can only actually occur with for-adverbials or with spent-an-hour type adverbials if they are shifted to activity predicates. They can shift because the activity is part of their meaning. The culmination portion is not compatible with the durative for-adverbial.

Since achievements have only the culmination and lack the activity portion, they are completely ruled out with for-adverbials, while accomplishments simply exhibit a shift in meaning.

Compare the degree of oddness of the achievement predicate notice the painting and the accomplishment paint the painting:

22a. *John noticed the painting for a few minutes
?John painted the picture for a few minutes

b. *John spent a few minutes noticing the picture
John spent a few minutes painting the picture

The second sentence in each set takes on the activity reading, and therefore loses the entailment that the accomplishment (painting the picture) was ever completed but is still grammatical. However, the first sentence in each set is ungrammatical.

This test separates the collective predicates into the predicted groups and once again, membership in the achievement class correlates with the unacceptability of all as a determiner in the subject.

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4. The almost ambiguity test

Accomplishment predicates are ambiguous when 'almost' is added:

23a. John almost painted the painting.

The sentence means either that John painted, but didn't finish the picture, or that he never started painting the picture. Activity and achievement predicates are unambiguous with 'almost'. I will omit consideration of states from the following discussion.

activities

24 a. John almost walked
b. John almost pushed the cart

These are unambiguous. In particular, (24b) does not mean that 'John pushed, and the thing he pushed was almost a cart'

achievements

25 a. John almost noticed the painting
b. John almost reached the summit

These are also unambiguous

The ambiguity is related to the scope of almost. Accomplishment predicates have two parts - the activity and the culmination/result of the activity. Almost can have narrow scope over only the result or it can have wide scope over the whole predicate. Both achievement and activity predicates have only one part, so there is no choice of scope for almost and hence no ambiguity. This difference in scope possibility is related to the class of the predicate, not to the presence or absense of an object (i.e. to two syntactic parts, an internal and external phrase [vp [np] ]). This is informalized below:

John almost drove a car : almost-did ( drive a car)

John almost destroyed a chair:
John did (almost-destroy) a chair
John almost-did (destroy a chair)

The same distributional pattern is observed in the collective predicates:

ambiguous: The children almost built the raft
The men almost carried the piano upstairs

unambiguous: The students almost gathered in the hall
The senators almost passed the amendment
The voters almost elected Bush

Again, elect and pass are distinguished from build as collective achievements rather than accomplishment predicates.

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3. stop + pred

The addition of 'stop' (or 'start') focuses on a terminal end of an activity. This is compatible with activity predicates and with the activity-including accomplishment predicates. 'Stop' is not compatible however with the activity-lacking achievement predicates or with state predicates.

states

26 a *John stopped knowing the answer
b ?John stopped understanding the explanation

Some of the states seem to be compatible with 'stop'. For example, we can say "John stopped loving Mary". It seems that

in these cases the state has been shifted to an activity.

activities

27.a John st pped walking
b John stopped pushing the cart

accomplishments

28 a John stopped painting the picture
b John stopped reading the book

achievements

29 a. *John stopped noticing the picture
b *John stopped reaching the summit

If we test our typical collective predicates gather, build the raft and elect or pass in the stop+predicate context, once again the predicates which are not compatible with all fall into the achievement class of predicates:

30 a. #The students stopped gathering in the hallway (sounds habitual)
b. #The children stopped walking single file (ambiguous?)
c. The children stopped building the raft
d. The movers stopped carrying the piano upstairs
e. *The senators stopped passing the amendment
f. *The voters stopped electing Bush president

The proposed achievements behave as predicted and are ungrammatical with 'stop'. The accomplishment predicates 'build the raft' and 'carry the piano upstairs' also behave as predicted. The collective activities (if they are in fact activities) are less clear and need further review.

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6. finish + pred

Finish is somewhat like stop, but instead of focusing on the end of the activity, it focuses on the completion of the task. Again, it is compatible with accomplishements. It is also compatible with activities, which shift to accomplishments. However, it is not compatible with the achievement predicates. For the time being, I want to appeal to an informal notion of prohibition of vacuous application of 'finish' to explain this incompatibility. It may become more formal later on.

This test distinguishes achievements from accomplishments, and

from activities. It is not very useful with states, most of which are odd at least with 'finish', but some of which sound better than others, particularily those which are stage-level (temporary) and agentive.

states

31 a. *John finished knowing the answer
b. *John finished loving Mary
c. *John finished being intelligent

activities

32. a. John finished walking
b. John finished pushing the cart

accomplishments

33 a. John finished painting the picture
b. John finished reading the book

achievements

34 a. *John finished noticing the picture.
b. *John finished reaching the summit.

This test also distinguished among the types of collective predicates seen above with all:

35 a. The children finished building the raft (accomplishment)

b. The students finished gathering in the hallway (activity?)

c. *The senators finished passing the amendment (achievement)

d. *The voters finished electing Bush president (achievement)

e. The students finished voting for the proposal. (distributed only)

f. ??The trees finish being dense at the edges of the forest. (state)

As expected the collective achievements (c & d) are not compatible with 'finish', in contrast to the collective accomplishment in (a). In sentence (e), only the distributed sense of cast a vote for is compatible with 'finish'. The collective achievement 'vote for' is excluded. The sentence in

(f) is odd, though perhaps not impossible.

VII. Summary

Thus, on five different tests, the progressive test, in/for/it took/x spent test, the stop test, the almost test and the finish test, a pattern emerges in which the same collectives that did not allow all in the group subject pattern together as either achievement predicates or state predicates. In contrast, the collective predicates like build the raft, which is a clear case of an accomplishment predicate, and like gather which is either an accomplishment or an activity, are compatible with all.

It seems that the interaction of the aktionsarten distinction and the collective/distributive distinction has not figured prominently in the literature. However, if the aktionsarten are relevant to the distribution and behavior of distributed predicates, then the most straight forward assumption is that they will also cross-classify the collective predicates and determine facts about their distribution as well. It turns out that this classification is just what we needed to single out the collective predicates that could not occur with 'all'.

By means of a classification that is motivated completely by independent facts about the language, we can successfully group the predicates that can and cannot occur with all. It seems that all distributive predicates can occur with all. Furthermore, among the collective predicates, those which are activity or accomplishement type predicates can occur with all. These are the predicates which have an activity component. The collective states and achievements, which lack any activity component, are incompatible with all.

To compare this approach with the subentailment proposal found in Dowty(86), there are several considerations. The immediate advantage of aktionsarten over subentailments is that they are a traditional and independently motivated method of predicate classification. Thus, the individual machinery introduced into the theory to explain the behavior of all with collectives is minimized.

Moreover, a predicate can be independently identified as a member of a particular aktionsart by several tests, as illustrated above. This allows us to overcome the major criticism against the subentailments approach - our inability to determine whether a predicate has distributive subentailments except by examining whether or not it can occur with all.

For example, we have seen that collective states are

incompatible with all. Dowty's pure cardinality predicates are state predicates, as can be seen by their failure to occur in the progressive. A predicate like 'be denser in the middle of the forest' is also a state, as the ungrammaticallity of *The trees are being denser in the middle of the forest attests. For Dowty this predicate was problematic, first because he was not comfortable grouping it with the pure cardinality predicates and secondly because he has no principled way of explaining its lack of subentailments. He says,

"Perhaps the reason for the anomaly of this example of Partee's is that collective dense (and sparse) does not have any sub-entailments, thus nothing for all to operate on. Yet it is curious that this verb should not have a meaning parallel to that of the locative collectives gather, disperse, meet, etc., i.e. have the distributive sub-entailment "Has a location which is relatively close, in every direction, to that of another member of the group". Possibly this does not get the truth conditions quite right, but I do not see why."

Once a predicate has been identified as needing to have subentailments because it allows all in the subject, an approximate description of what they must be is not hard to provide, but we cannot independently predict whether a predicate will have subentailments. By relying instead on the aktionsarten distinction, we can say that dense differs from gather in being a state rather than an activity. A number of other tests allow us to identify it as a state and this allows us to correctly predict that it will not be compatible with all.

Furthermore, achievement predicates are also incompatible with all. The subentailment approach only provides two collective classes, those with and without subentailments. Although Dowty didn't actually consider collective achievements, except for the confusing case of the ambiguous vote for, he would have had to group them together with the states, or in his terms the 'pure cardinality predicates'. This further strains the intuitive appeal of the 'pure cardinality' classification and is an unnatural grouping of clearly different predicate types. By recognizing the four classes, we can group states and achievements together by what they both lack, namely a durative activity component. This is a negative grouping which does not predict that the two classes pattern together in other ways, unless related to the property they mutually lack.

In conclusion, aktionsarten appear to be a less stipulative, more descriptively adequate classification of collective predicates as well as a better method of predicting whether a given collective predicate will be compatible with the distributive determiner all.

In the following section I will discuss two other sources of data which support the aktionsarten approach to explaining the compatibility of collective predicates with all. I will be considering two types of complex predicates, verb + particle combinations and 'finish' + predicates combinations. Both of these combinations focus on the culmination of an activity and therefore create achievement predicates. If we consider the behavior of these new predicates with all we find that, as predicted from the foregoing analysis, they are not acceptable. Hence this provides further evidence that the achievement predicate classification is the right one to makes the distinction between predicates which do or do not occur with all.

VIII. Achievements from verb+particle combinations

Bolinger(71) on particle constructions says: "The importance of resultant condition suggests a hypothesis about the nature of the adverbial particles that may form part of a phrasal verb. I offer this: In its core meaning (though not necessarily in the figurative extensions discussed in Chapters 9 and 10) the particle must contain two features, one of motion-through-location, the other of terminus or result. "

The impressionistic use of terms like 'resultant condition' and 'terminus or result' suggests that again the classification of accomplishment or achievement predicate, with the necessary culmination or result meaning, is the right distinction to analyze what Bolinger is describing. Dowty(86) states that particles transform activities into accomplishments. but by the distinguishing criteria described above, the derived verb + particle predicates are actually achievement predicates. Consider, for example, the verb eat and the more resultative verb + particle combination eat up:

36a. John ate the cake.
a' John ate up the cake.
b. John stopped eating the cake.
b' *John stopped eating up the cake
c. John finished eating the cake.
c' *John finished eating up the cake.

37. John is eating up the cake ==>
John is going to eat up the cake

The above tests demonstrate that a verb+particle combination like 'eat up' combined with 'the cake' is an achievement predicate. The importance of the object 'the cake' is that it is a singular, definite object and makes the predicate a collective when applied to plural subjects. This contrasts with object like 'cake','a cake' or 'cakes', which is

indefinite or plural. When combined with a plural subject, the predicate can still be distributive. (eg. everyone can eat up his own individual cake) Only 'consumable' definite objects that cannot be regenerated will force the collective reading.

Certain verb-particles combinations with 'consumable' objects are, as predicted, not good with all in the subject:

38 a. (*All) The guests ate up the cake
(cf. 'their cake')

b. (*All) The students drank up the beer
(cf. 'their beers')

c. (*All) The gang members beat up the old man
(shift from 'take part in' to separate beatings)

d. (?All) The dogs chewed up the bone
cf. (all) the dogs chewed at the bone
vs. All the dogs chewed up the rug?
(B. Partee, p.c.)

e. (?All) The kids finished off the cake

f. (?All) The tourists killed off the native wildlife
Not the reading in which the native wildlife was killed because of "all the tourists",

These verb+particle predicates provide an entire class of achievement predicates against which to test the hypothesis that collective achievement predicates are not compatible with all. They are all unacceptable or odd, with all, as expected, thus providing support for this hypothesis.

IX. finish+pred achievements

Another method of deriving an achievement predicate is by adding the verb "finish" to an activity or accomplishment predicate, creating a complex predicate which focuses on an end result or culmination rather than on the action. As discussed above in section VI, predicates that are already achievement predicates cannot be combined with finish. I suggested informally that this was because finish needs a non-achievement to transform into an achievement. Now however, we can consider the effect of finish on an accomplishment predicate which has previously been compatible with all. The derived predicate is in the achievement class and is therefore predicted to be incompatible with all in the subject determiner:

39. a. *All the children finished building the boat.
b. *All the men finished carrying the piano upstairs.

This provides more support for the use of aktionsarten to account for the incompatibility of all with some collective predicates. Processes which derive achievement predicates also derive predicates that are odd or ungrammatical in combination with all.

X. Conclusion

The classification of collective predicates into Aktionsarten has been shown to correctly distinguish between collective predicates that are incompatible with the determiner all and those that, although collective, are compatible with all. Activity and accomplishment predicates, the class of predicates which have an activity or task component to their meaning, are compatible with all, while states and achievements, which lack this activity component, become ungrammatical when all is in the subject. Moreover, use of this classification correctly predicts that derived achievements, such as the verb-particle combinations or the finish+pred combinations described above, will be ungrammatical with all. This approach achieves a considerable measure of descriptive success.

Dowty focused on the presence or absence of a distributive part of the collective predicate meaning as the factor determining whether all is acceptable with a collective. In replacing the distributive subentailment requirement with the more specific activity component requirement, I have basically lost the insight that all is a distributive determiner and must be able to distribute the predicate over entities in the subject group. Moreover, at this point, the relationship between the presence of an activity component and the acceptability of all remains unexplained. Although I have not provided a detailed analysis of the compositional structure of aktionsarten, I have assumed that we can talk in terms of 'activity' components and 'result' components, and that activities and accomplishments are the natural class of predicates sharing the former component, while accomplishments and achievements share the latter component. Without an explanation of the connection between the activity component and distribution, it is theoretically just as likely for the presence of the result component to be the necessary factor that allows the determiner all, so that only achievement and accomplishment predicates were compatible with all.

I think this is undesirable. Although I do not have cross-linguistic data to support my intuition that languages would not make this alternative division, it seems that there must be a non-accidental connection between the presence of an activity component and the possibility of distributivity. Activities often seem to be essentially distributive.

Consider again the problem of the non-equivalence of a

collective with all and with the fully distributive determiner every that was discussed by Link.

40 a. All the children built the raft *-->
Every child built the raft

b. All the children were building the raft --->
Every child was building the raft

The sentence with all in (40a) above is not equivalent to the following sentence with every. In fact, the sentence with every does not have the reading in which there is only one raft and it is built only once (only the rebuildable raft reading is available).

However, in (40b) the sentences have been put into the progressive tense. This shifts the accomplishment predicate build the raft to an activity, with the resulting loss of any entailment that the result or culmination (that the raft is built) is ever reached. Somewhat surprisingly, in the progressive form, the version of the sentence with every is less pragmatically odd and the interpretation that there is a single raft and a single raft-building is available. Thus, there is a reading of the all version of the sentence and of the every version that are nearly equivalent when the predicate is an activity.

If activity predicates are always distributive, then the requirement that collectives have an activity component if they occur with all is not accidental. All is a distributive determiner and requires a predicate which is distributive or has a distributive component in order to operate grammatically. Also, since result or culmination components are not essentially distributive, we would not expect to find any other language which only allows collectives that have a result component to occur with all in the subject.

Although not formalized, this is the sort of approach which could yield an explanation of the connection between the presence of an activity component in a collective predicate and the acceptability of a distributive determiner like all. However, if activities are themselves always distributed, then we would not expect to find predicates which seem to be collective activities. Collective activities do exist, however. Predicates like gather, disperse, surround or circle are possible collective activities (although they also have accomplishment readings). Similarily, predicates like walk single file or play in teams of four are collective but are activities by the tests described above.

Clearly it is not possible to maintain the hypothesis that all

activities are distributive and that therefore a predicate with an activity component will have some distributivity, even if it is collective. Hopefully, a more detailed account of the composition of aktionsarten will suggest a way of capturing the distributivity of activities while allowing for the existence of collective activity predicates.

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**End Notes**

[1] Here and throughout the paper, I will use '#' to indicate that the sentence does not have the intended meaning, although it is grammatical in other senses.

[2] This point was first brought to my attention by comments by Paul Portner and Rosemarie Deschaine in the proseminar on quantification at UMASS in the fall of 1988.

[3] Vendler proposed the four classes as a classification of verbs, and hence as a lexical property. This is demonstrably not correct, as has been discussed extensively, elsewhere. In addition to the basic verb, the type of direct object (definite, indefinite, plural, singular), the tense of the verb, the presence of adverbs and even the type of subject NP can all influence the ultimate categorization of the sentence with respect to Aktionsarten. Thus the aktionsart is a property of a derived category, either the VP or possibly the S. Throughout the paper I use the 'predicate' with the intention of remaining neutral on the question of what the ultimate category involved is. Thus, this paper supports the existence of the four Vendlerian categories (in constrast to other proposals which claim that some of those categories are not necessary) , but does not support Vendler's actual proposal in all its details.

[4] I am grateful to Angelika Kratzer for calling my attention to the lack of biconditional implication in these paraphrases and to the need for clarification.

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